AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1-46. (cancelled)

47. (previously presented) A dual-chain avidin (dcAvd) comprising a fusion of two avidin monomers, the avidin monomers selected from circularly permuted monomers of:

circularly permuted avidin comprising a new N-terminus that is before β-strand 5 and a new C-terminus that is after β-strand 4 (cpAvd5→4);

circularly permuted avidin comprising a new N-terminus that is before β-strand 6 and a new C-terminus that is after β-strand 5 (cpAvd6→5); and

circularly permuted avidin comprising a new N-terminus that is before β-strand 4 and a new C-terminus that is after β-strand 3 (cpAvd4→3),

wherein the C-terminal amino acid of one of the two avidin monomers and the N-terminal amino acid of a second of the two avidin monomers are joined directly or via a linker, thus creating the new C-terminus and the new N-terminus, and the circularly permuted avidin monomer binds biotin or other ligand.

48. (currently amended) The dual-chain avidin of claim 47, wherein in the circularly permuted avidin, the avidin is selected from wild-type avidin, ~~a mutant form of avidin,~~ streptavidin, a variant of avidin, poultry avidin, and chicken avidin-related protein (AVR).

49. (previously presented) The dual-chain avidin of claim 47, wherein the C-terminal amino acid and N-terminal amino acid have been joined by a linker comprising one or more amino acids.

50. (previously presented) The dual-chain avidin of claim 49, wherein the linker is a hexapeptide comprising four glycine amino acids and two serine amino acids, and a glycine is connected to the C-terminal amino acid and a serine is connected to the N-terminal amino acid.

51. (previously presented) The dual-chain avidin of claim 47, wherein the circularly permuted avidin has a biotin binding affinity that is different from the biotin-binding affinity of wild-type avidin.

52. (previously presented) The dual-chain avidin of claim 47, wherein the circularly permuted avidin has a HABA-

binding affinity that is different from the HABA-binding affinity of wild-type avidin.

53. (previously presented) The dual-chain avidin of claim 47, wherein the avidin monomer has been mutated.

54. (canceled)

55. (currently amended) The dual-chain avidin of claim 54, wherein the avidin monomer has been mutated by changing tyrosine 33 to histidine (Y33H), isoleucine 117 to cysteine (I117C), serine 16 to alanine (S16A), threonine 35 to alanine (T35A), and/or asparagine 118 to methionine (N118M), as referenced by SEQ ID NO: 1.

56. (previously presented) The dual-chain avidin of claim 47, wherein the two avidin monomers are fused together directly or joined by means of a spacer.

57. (previously presented) The dual-chain avidin of claim 56, wherein the spacer is a peptide spacer of about 1 to 40 amino acids.

58. (previously presented) The dual-chain avidin of claim 57, wherein the spacer is a peptide SGG or SGGS (SEQ ID NO: 30).

59. (previously presented) A dual-chain pseudo-tetrameric avidin, comprising two dual-chain avidin molecules (dcAvd).

60. (previously presented) The dual-chain pseudo-tetrameric avidin of claim 59 that binds biotin.

61. (previously presented) A single-chain avidin (scAvd), comprising the two dcAvd molecules of the dual-chain pseudo-tetrameric avidin of claim 59 fused together to form a single polypeptide.

62. (previously presented) The single-chain avidin of claim 61, wherein the two dcAvd molecules are fused together via a linker.

63. (previously presented) The single-chain avidin of claim 62, wherein the linker is a 12 amino-acid linker GGSGSGSGSGSG (SEQ ID NO: 31).

64. (previously presented) An isolated polynucleotide encoding the dual-chain avidin of claim 47.

65. (previously presented) A recombinant vector comprising the polynucleotide of claim 64, wherein the polynucleotide is DNA.

66. (previously presented) A host cell comprising the polynucleotide of claim 64, wherein the polynucleotide is DNA.

67. (previously presented) A method for producing a dual-chain avidin (dcAvd) comprising expressing the dual-chain avidin in the host cell of claim 66, wherein the dcAvd is encoded by the polynucleotide.